

Figure 1

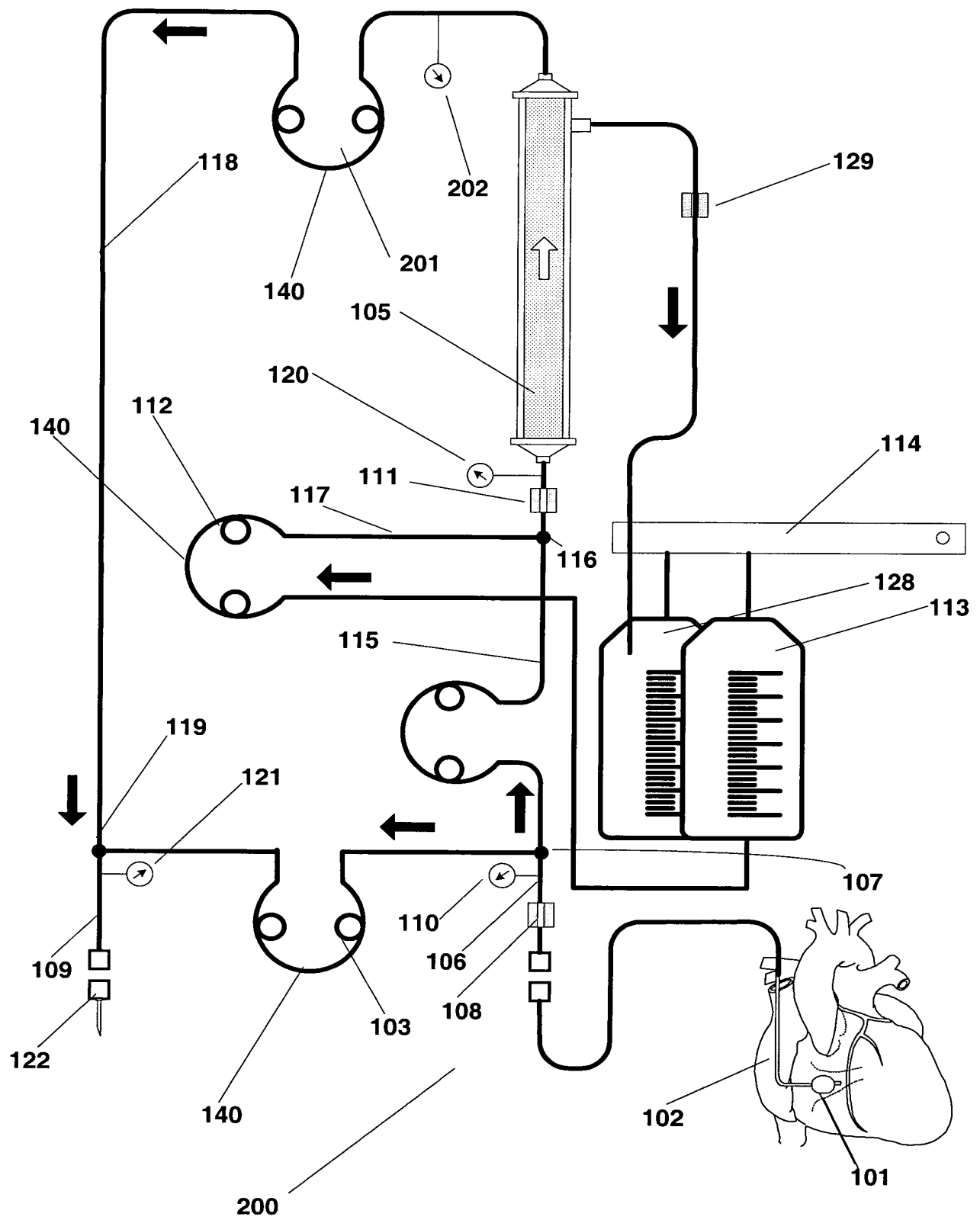


Figure 2

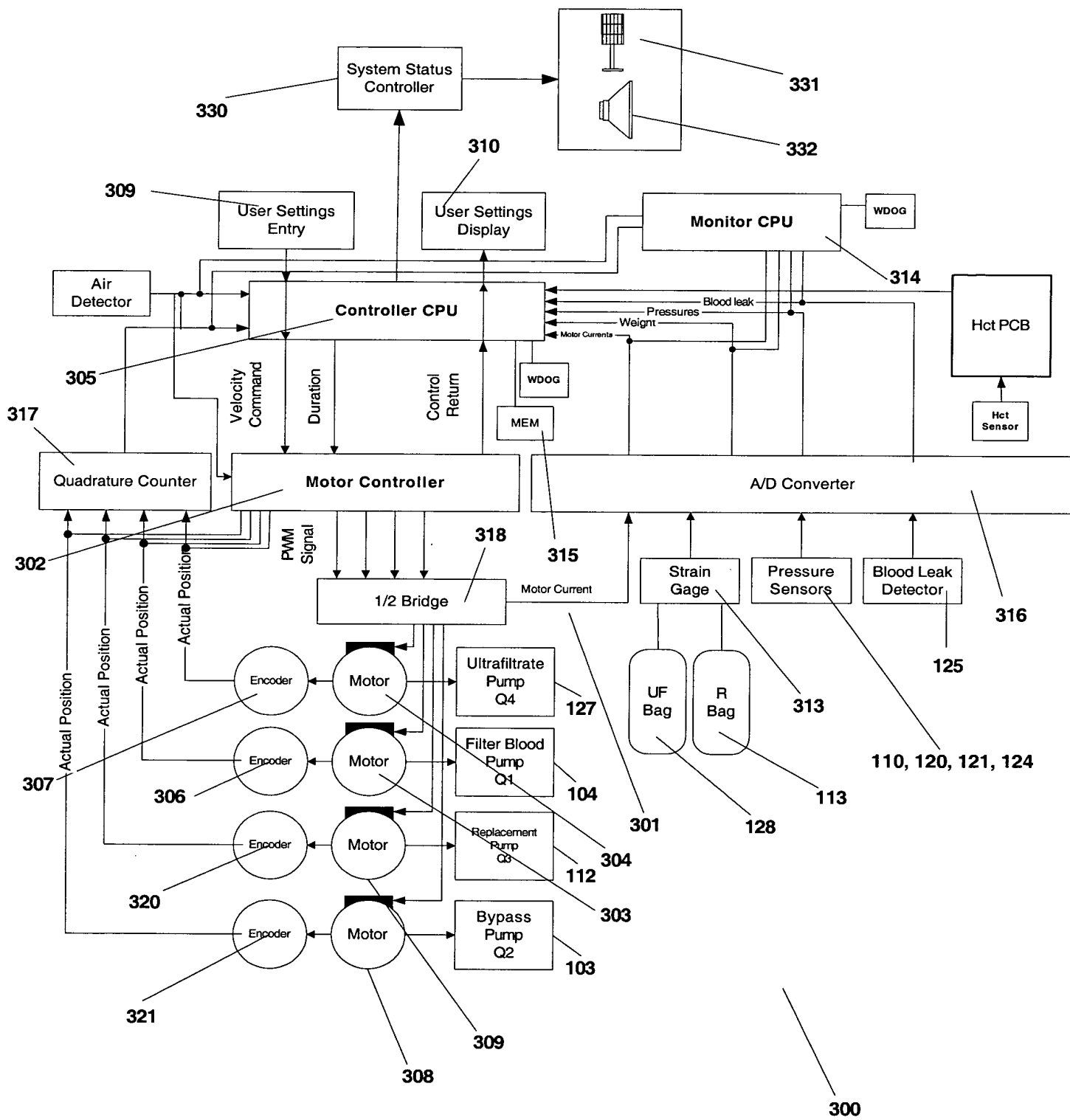
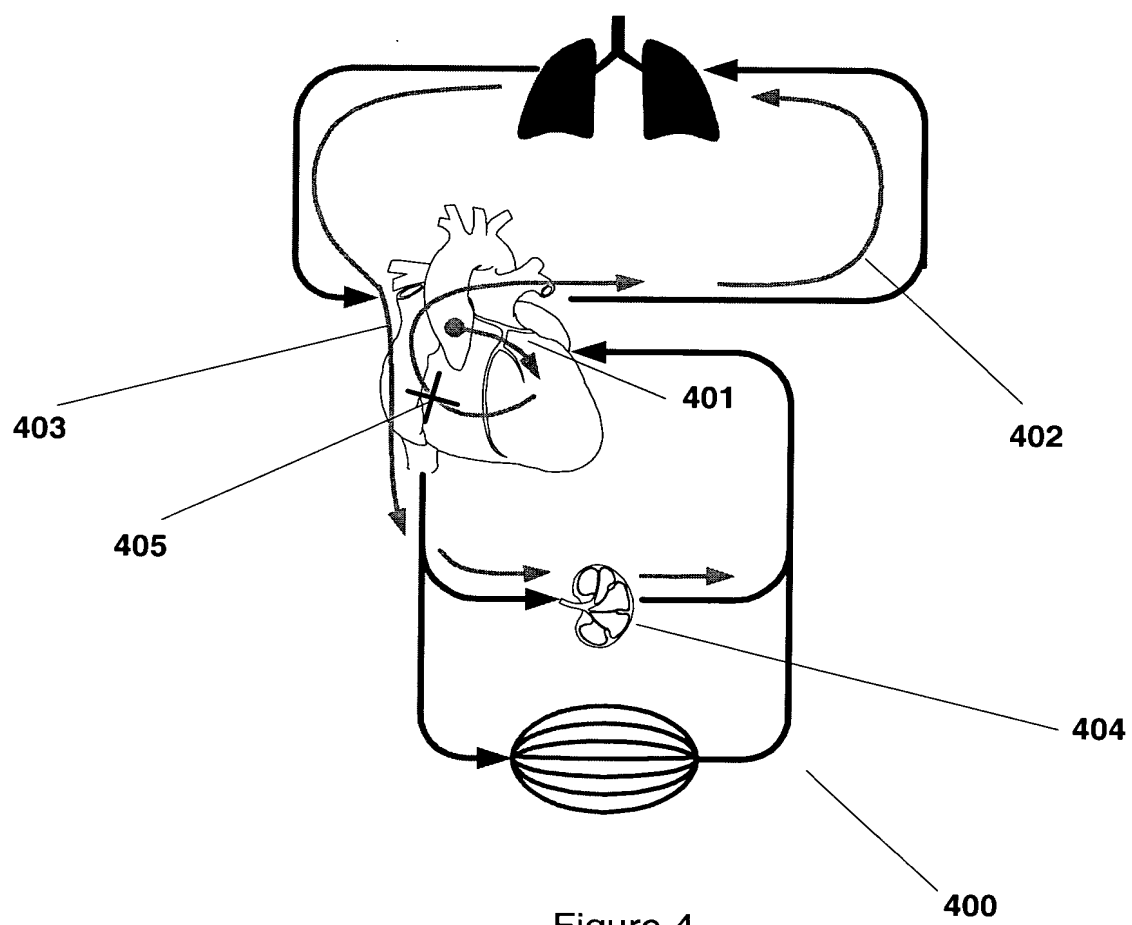


Figure 3



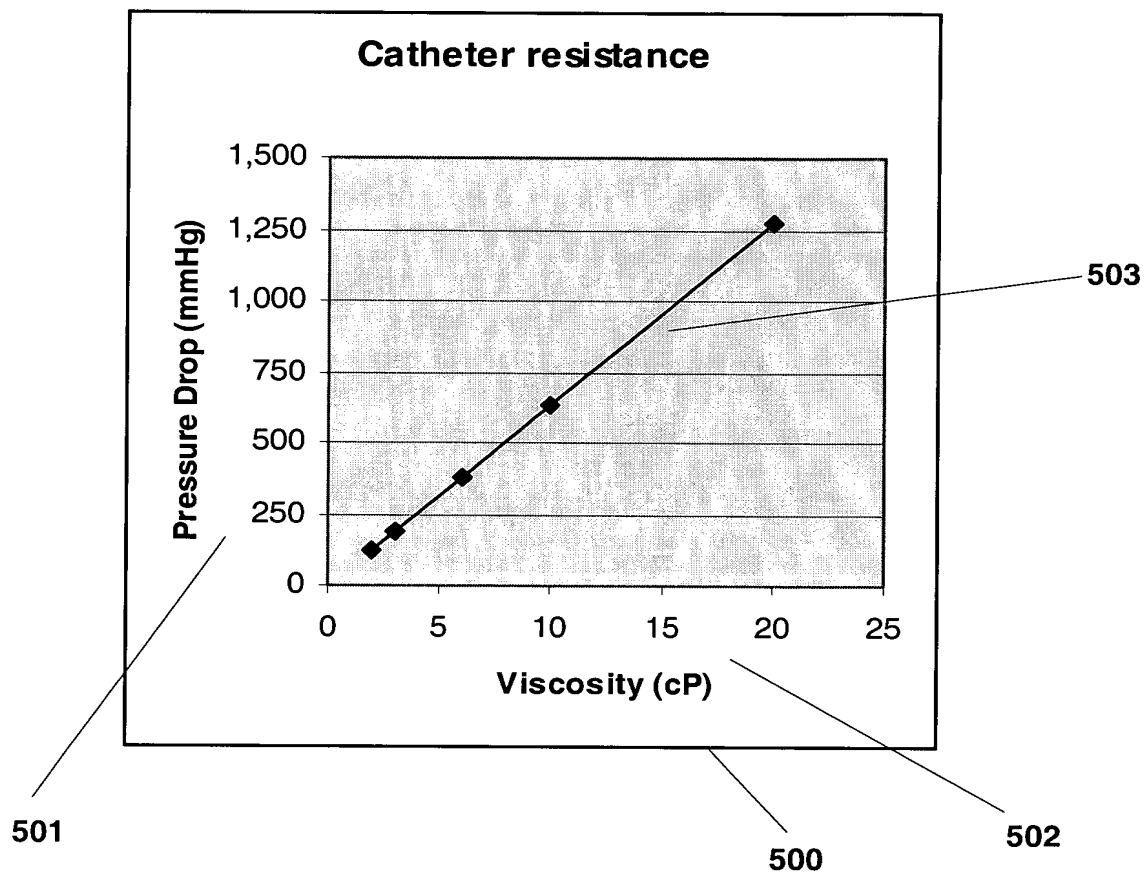


Figure 5

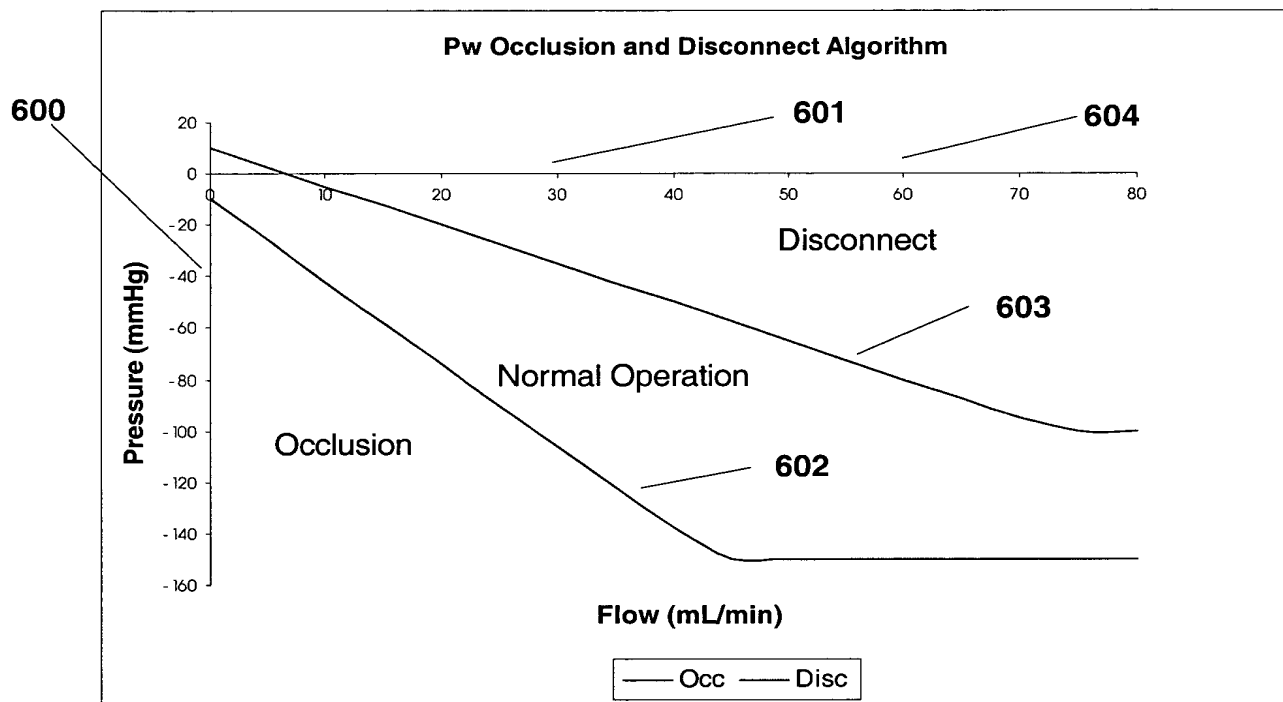
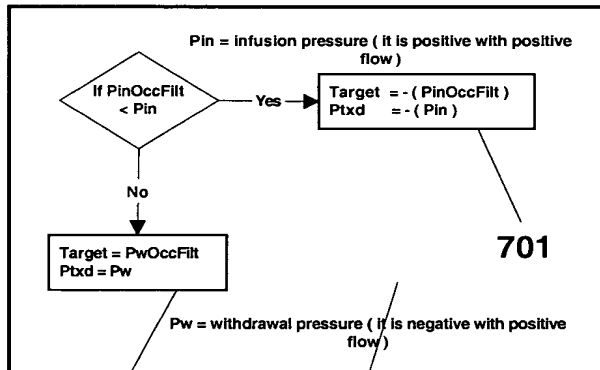
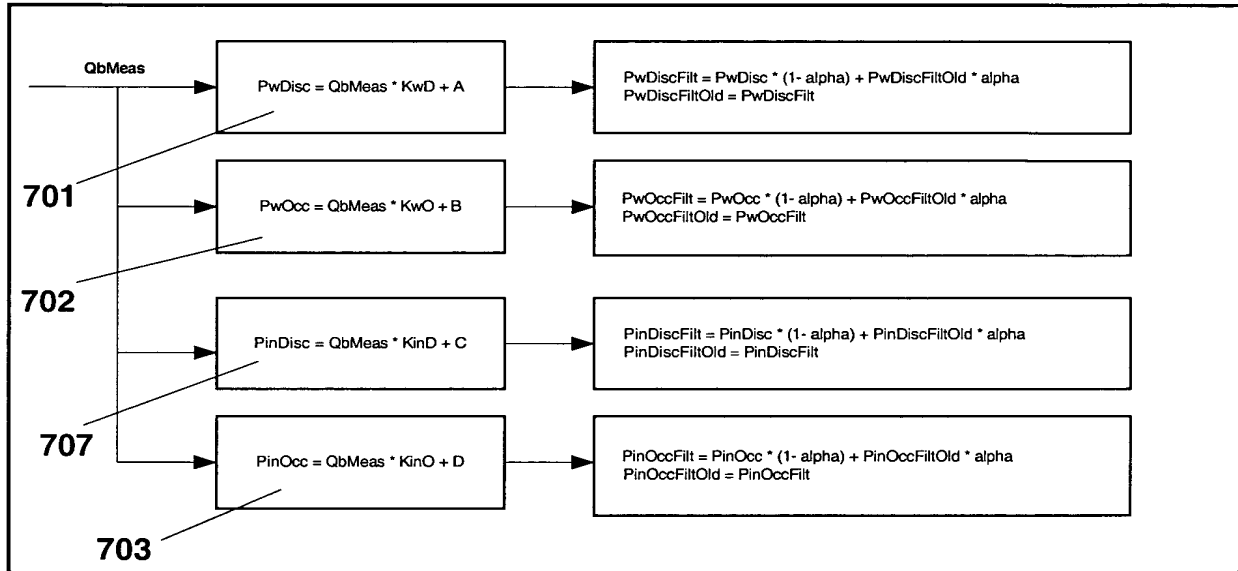


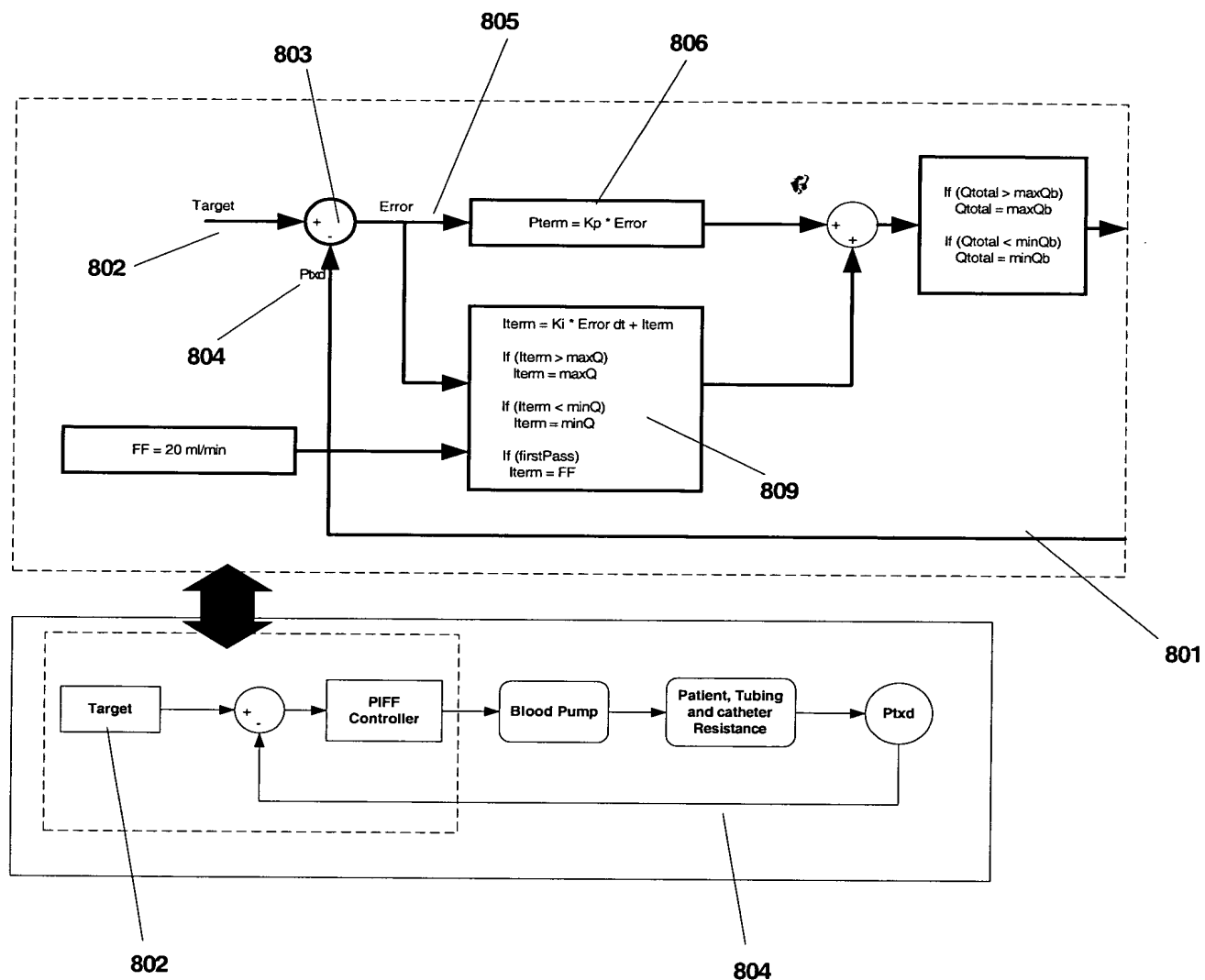
Figure 6



where :

PwDisc	=	Withdrawal Disconnect Pressure
PwDiscFilt	=	Filtered Withdrawal Disconnect Pressure
PinDisc	=	Infusion Disconnect Pressure
PinDiscFilt	=	Filtered Infusion Disconnect Pressure
PwOcc	=	Withdrawal Occlusion Pressure
PwOccFilt	=	Filtered Withdrawal Occlusion Pressure
PinOcc	=	Infusion Occlusion Pressure
PinOccFilt	=	Filtered Infusion Occlusion Pressure
QbMeas	=	Measured Blood Flow using encoder
alpha	=	Alapha constant for low pass filter
KwD	=	Slope of Withdrawal Disconnect
A	=	Offset of Withdrawal Disconnect
KwO	=	Slope of Withdrawal Occlusion
B	=	Offset of Withdrawal Occlusion
KinD	=	Slope of Infusion Disconnect
C	=	Offset of Infusion Disconnect
KinO	=	Slope of Infusion Occlusion
D	=	Offset of Infusion Occlusion
Target	=	Target Pressure

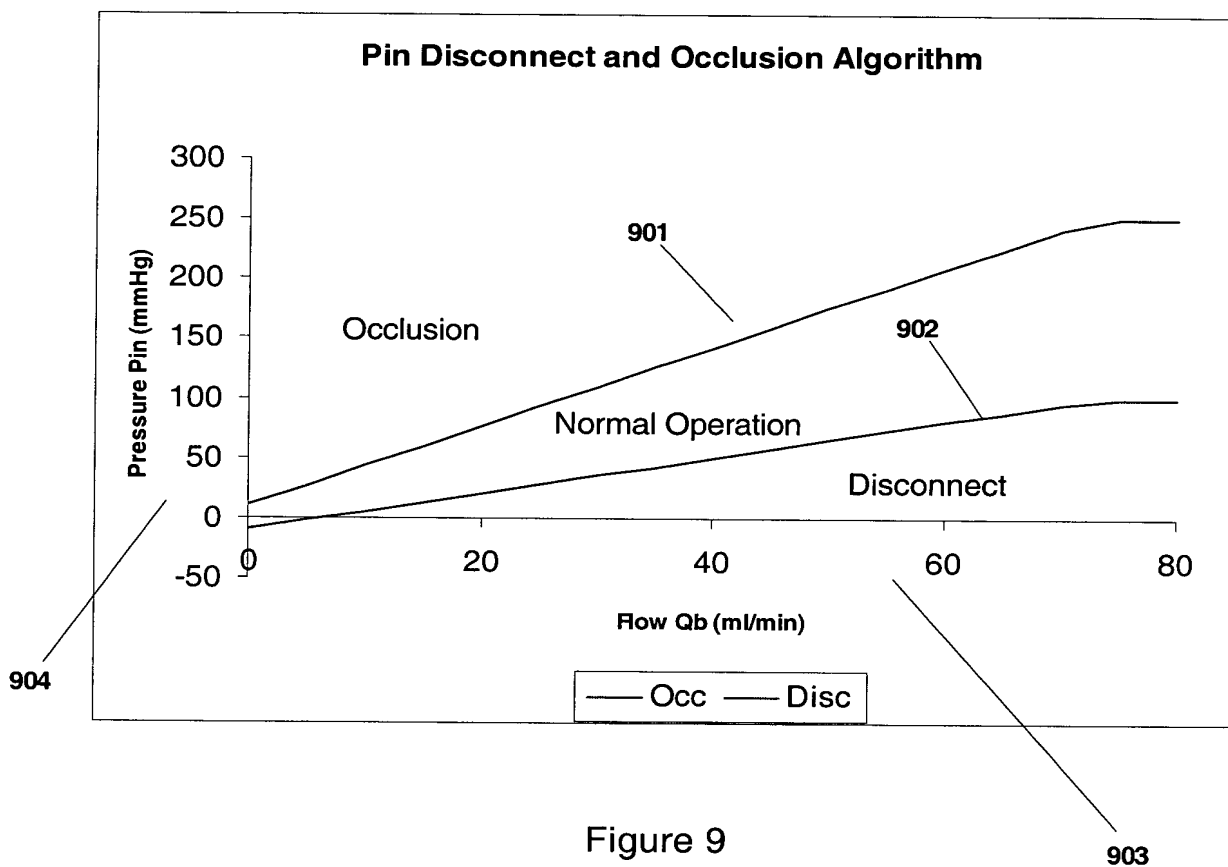
Figure 7



where

- K_p = proportional Gain
- K_i = Integral Gain
- dt = sample time of real time controller
- Error = difference between target and actual
- maxQ = maximum blood flow allowed
- minQ = minimum blood flow allowed
- Qtotal = sum of controller flow outputs ($P_{term} + I_{term}$)
- firstPass = variable which is true for first pass of loop only
- Txdr = transducer used for feedback
- FF = Feed Forward term

Figure 8



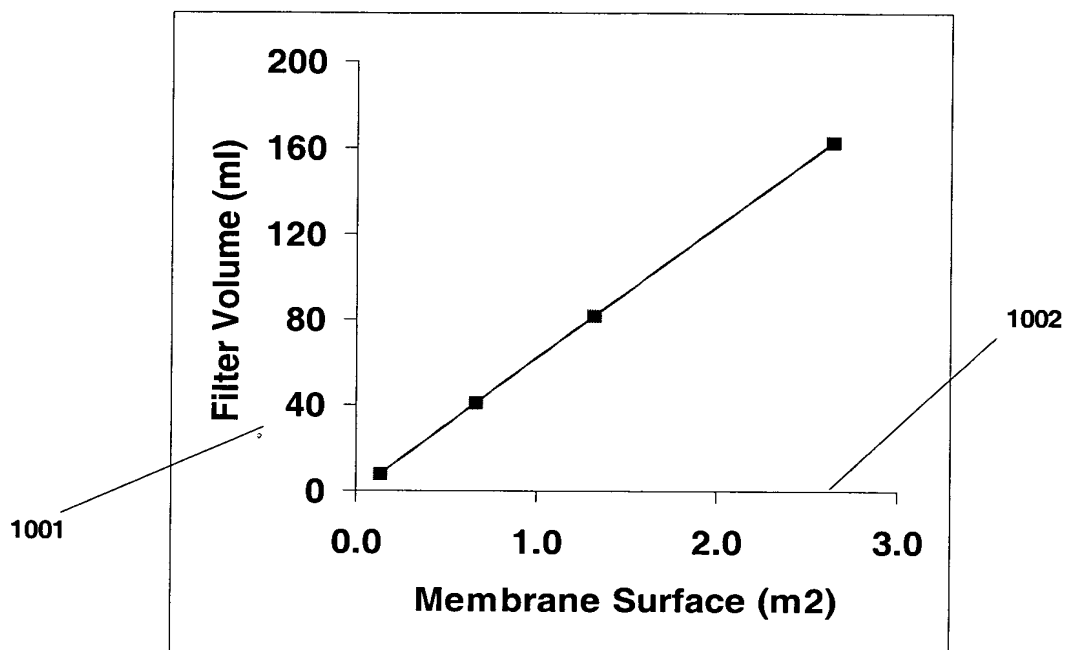


Figure 10

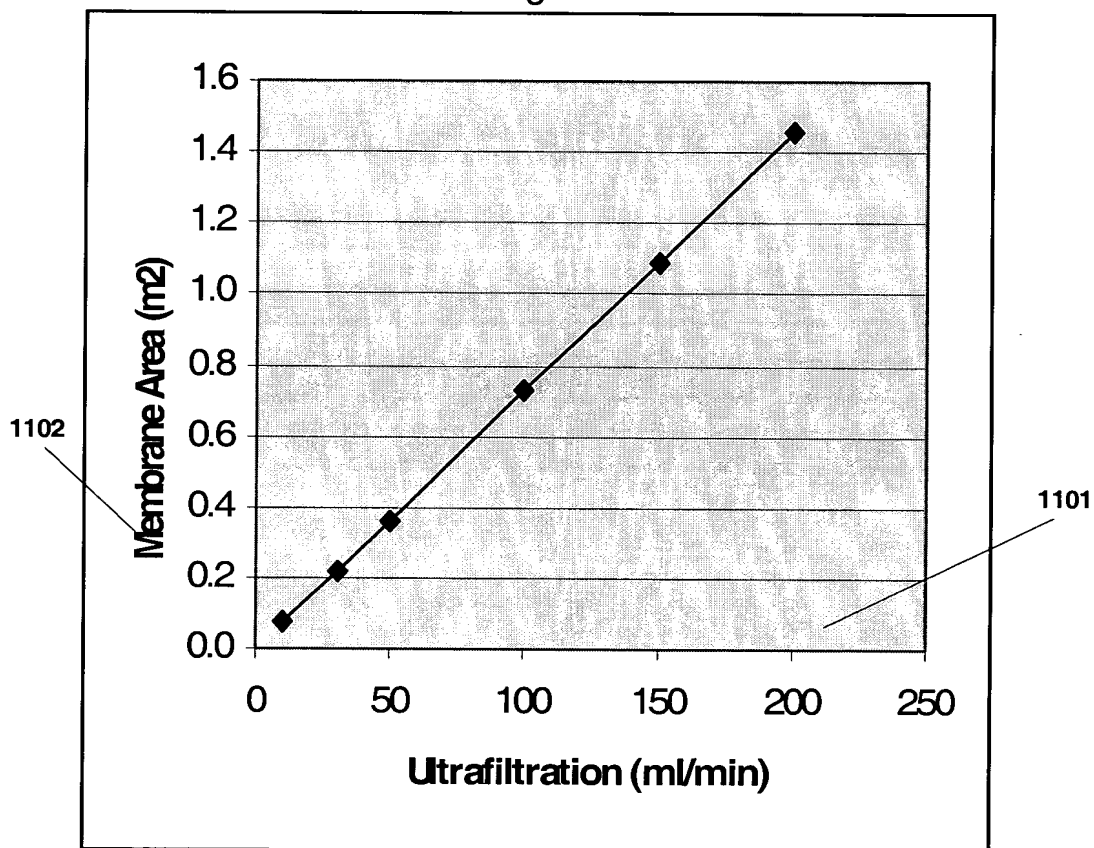


Figure 11

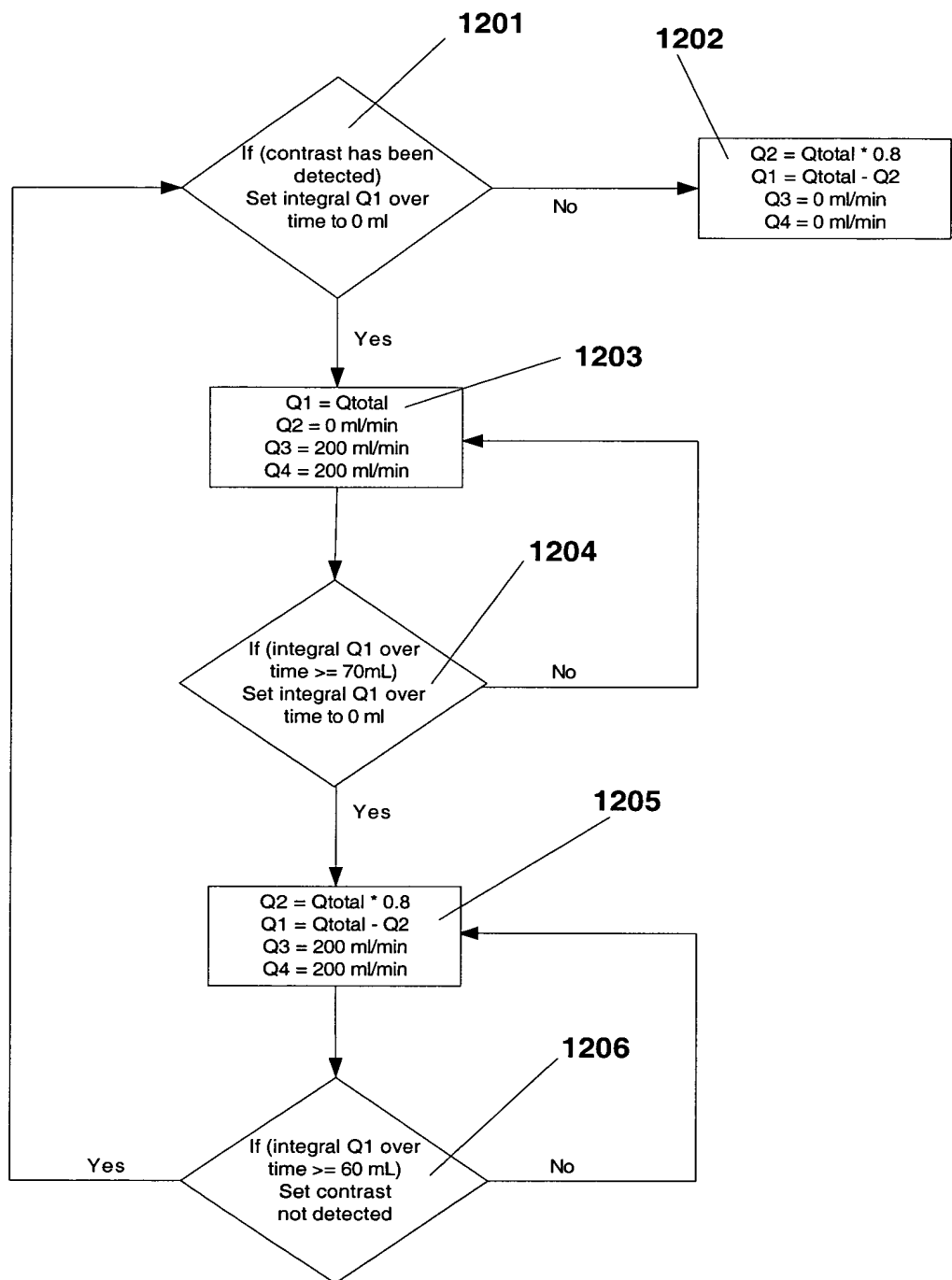


Figure 12

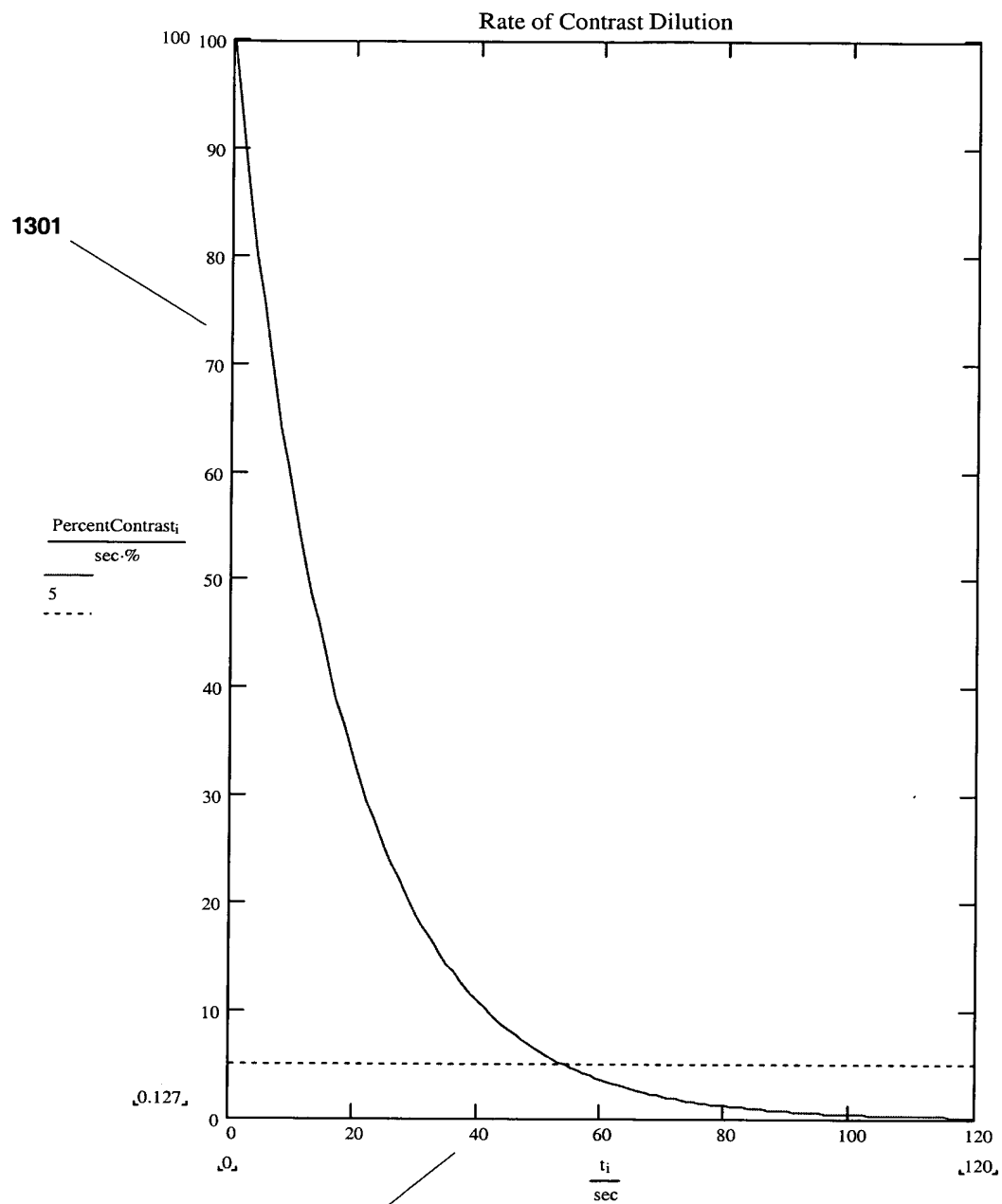


Figure 13

1302

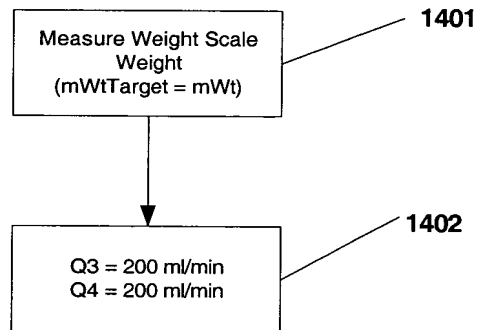
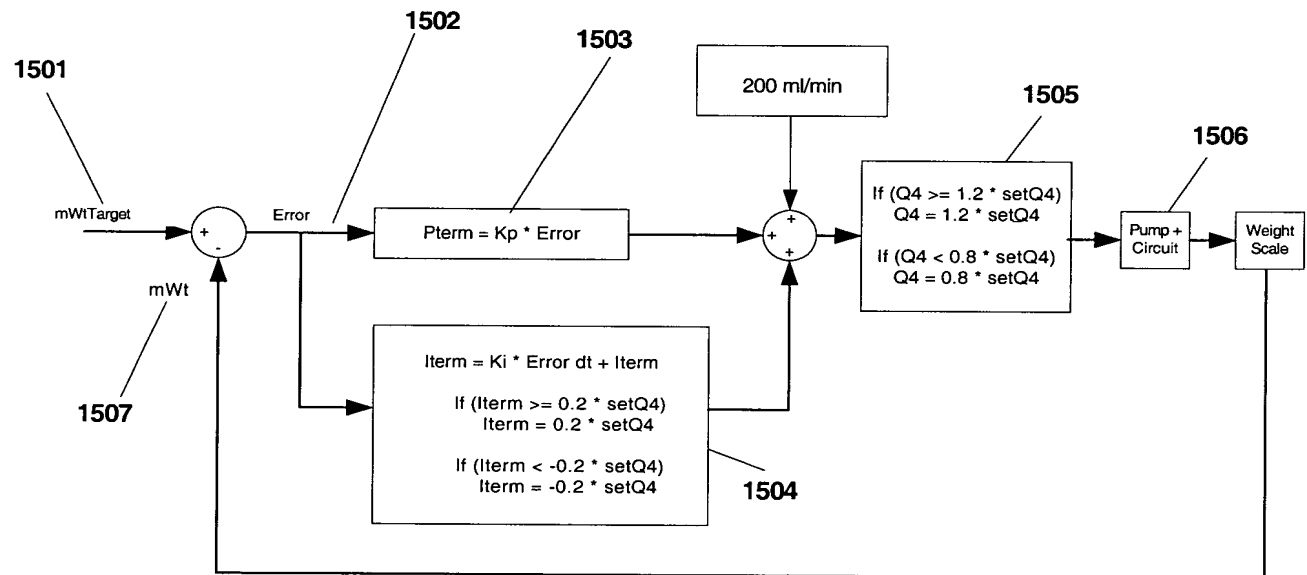


Figure 14



Where	
Kp	= proportional Gain (ml/min/kg)
Ki	= Integral Gain (ml/min/kg * dt)
dt	= sample time of real time controller
Error	= difference between target and actual
setQ4	= set ultrafiltrate flow allowed
Q4	= commanded ultrafiltrate pump set flow
mWt	= measured weight by weight scale
mWtTarget	= target weight

Figure 15



